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**PORTABLE COMPUTER STAND WITH INTEGRAL COMMUNICATION METHOD  
AND APPARATUS**

**by**

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### **Background of the Invention**

The present application is a continuation-in-part of co-pending U.S. Patent Application Serial No. 10/642,254 filed August 15, 2003, which is a continuation U.S. Patent Application Serial No. 09/798,873 filed March 1, 2001 now issued U.S. Patent No. 6,608,749. The entire text of each of the above-referenced disclosures is specifically incorporated by reference herein without disclaimer.

### **Technical Field of the Invention:**

The present invention relates generally to a stand and more particularly to a portable stand for providing structural support for portable computer device and for providing a communication path to peripheral devices for portable devices including portable computers such as a laptop or notebook computer.

### **Background**

Prior art stands for portable computers, sometimes called stands, bases, or docking stations, are known to those skilled in the art. For example, a conventional docking station is typically used for holding a portable computer such as a laptop or notebook computer. As most portable computers comprise a movable display screen, when docked, it is desirable that the display screen may be suitably oriented or positioned for proper viewing by one or more users.

A problem with this technology has been that viewing of a display screen of a portable computer by multiple users can be difficult. For example, in a group presentation with a laptop computer placed on a table, it is extremely difficult for a group of individuals to view the display screen as it can only be typically positioned in a restricted fashion that limits viewing range and/or fails to provide an ergonomic viewing position as well. Therefore, what is required is a solution that facilitates simultaneous viewing of the display screen by a group of individuals.

Another problem with this technology has been that even during a single user session, the display screen could only be positioned at such height that a single user has to look down,

thereby straining the neck and shoulders to lean forward into an uncomfortable hunched position. Therefore, what is also required is a solution that provides for ergonomic viewing positions of the display screen to a user.

Yet another problem with this technology has been the limited the number of peripherals that connect to this technology. Furthermore, the technology may be hard to transport, thus further limiting the user. Therefore, what is required is a solution that provides a communication path between a plurality of peripheral devices and a portable device.

One unsatisfactory approach, in an attempt to solve the above-discussed problems typically involves using a large and bulky stand or base for a portable computer to sit upon. However, a disadvantage of this approach is that a relatively large and/or bulky stand or base can be a cumbersome peripheral to carry around. Further, a large and/or bulky stand or base may be aesthetically unattractive. Therefore, what is also needed is a solution that meets the above-discussed requirements in a more effective manner.

Heretofore, the requirements of providing more effective viewability of a display screen of a portable computer without compromising portability and/or aesthetics referred to above have not been fully met.

### **Summary of the Invention**

The present invention generally provides an apparatus and method for providing ergonomic viewing positions as well as providing communication paths between peripheral devices to a variety of portable devices including a portable computer.

In one exemplary embodiment, a stand may include a base having a recess formed to receive a portable device, an anchor movably coupled to the base, a support pivotally coupled to the base, and at least one electrical connector incorporated in the stand. The portable device may include a desktop portion and a display portion. The anchor may be formed to engage the portable device when the desktop portion of the portable device is disposed in the recess of the base. The support may extend upwardly from the base for holding the portable device. The at least one electrical connector may provide a communication path between at least one peripheral device and the portable device. According to one aspect of invention, the apparatus

and method provide advantages in that viewability of a laptop computer can be readily extended by ergonomically orienting the laptop computer through the use of a portable stand and aesthetically coupling peripheral devices to the stand.

5 In another exemplary embodiment, a stand may include a base having a housing  
formed to receive a portable computer, an anchor movably coupled to the base, a support  
pivotaly coupled to the base, and a detachable module providing the communication path  
between at least one peripheral device and the portable computer. The detachable module  
may comprise a port replicator which may include a parallel port, a serial port, a PS/2 port, a  
USB port, and an Ethernet connection. The detachable mode may also comprise a hub, for  
10 example, a USB hub. The detachable module may also consist of an external media bay  
which may include a CD-RW drive, a CD drive, a DVD drive, a ZIP drive, and a 3.5 floppy  
drive.

In yet another exemplary embodiment, a stand may include a base having a recess  
formed to receive a portable device, a transmitter and receiver pair housed in the anchor  
15 coupling at least one wireless peripheral device to a portable device recessed in the base, an  
anchor movably coupled to the base, and a support pivotaly coupled to the base. According to  
one aspect of the invention, the transmitter and receiver may be an infrared transmitter and  
receiver. In another aspect of the invention, the transmitter and receiver may be a radio  
frequency transmitter and receiver.

20 According to another exemplary embodiment, a stand may include a base having a  
recess formed to receive a portable device, an anchor movably coupled to the base, a support  
pivotaly coupled to the base, at least one electrical connector incorporated in the stand  
providing a communication path between at least one peripheral device and a portable device  
recessed in the base, and a transmitter and receiver housed in the anchor for coupling at least  
25 one wireless peripheral device to a portable device recessed in the base. In one aspect of the  
invention, the transmitter and receiver may be an infrared transmitter and receiver. In another  
aspect of the invention, the transmitter and receiver may be a radio frequency transmitter and  
receiver. In yet another aspect of the invention, the electrical connector may comprise a  
detachable module comprising a port replicator. The electrical connector may also comprise a

hub, such as a USB hub. The detachable module may also consist of an external media bay which may include a CD-RW drive, a CD drive, a DVD drive, a ZIP drive, and a 3.5 floppy drive.

According to a further aspect of the invention, a method generally includes providing a  
5 stand having a base with a recess formed to receive a portable device having a desktop portion  
and a display portion; an anchor for engaging the desktop portion in the recess of the base; a  
support for holding the portable device; and at least one electrical connector incorporated in  
the stand for communicating between at least one peripheral device and the portable device.  
The method further includes interposing the desktop portion in the recess for ergonomically  
10 positioning the portable device. In one aspect of the invention, the electrical connection  
includes a detachable module, where the detachable module is a port replicator. In yet another  
aspect of the invention, the detachable module is a hub, such as a USB hub. Furthermore, the  
detachable module may also comprise an external media bay which may include a CD-RW  
drive, a CD drive, a DVD drive, a ZIP drive, and a 3.5 floppy drive.

15 According to yet a further aspect of the invention, a method generally includes  
providing a stand having a base having a housing formed to receive the desktop portion of the  
portable computer; an anchor for engaging the desktop portion in the housing of the stand  
base; a support for holding the portable computer; and a transmitter and receiver housed in the  
anchor for communicating between at least one wireless peripheral device and the portable  
20 device. The method further includes interposing the desktop portion in the recess for  
ergonomically positioning the portable device. In one aspect of the invention, the transmitter  
and receiver include a radio frequency transmitter and receiver. In yet another aspect of the  
invention, the transmitter and receiver include an infrared transmitter and receiver.

According to another aspect of the invention, a method generally includes a stand  
25 having a base having a housing formed to receive the desktop portion of the portable  
computer; an anchor for engaging the desktop portion in the housing of the stand base; a  
support for holding the portable computer; a transmitter and receiver housed in the anchor for  
communicating between at least one wireless peripheral device and the portable device; and at  
least one electrical connector incorporated in the stand for communicating between at least

one peripheral device and the portable device. The method further includes interposing the desktop portion in the recess for ergonomically positioning the portable device. In one aspect of the invention, the transmitter and receiver include a radio frequency transmitter and receiver. In yet another aspect of the invention, the transmitter and receiver include an infrared transmitter and receiver. Furthermore, in one aspect of the invention, the electrical connector includes a detachable module, where the detachable module is a port replicator. In yet another aspect of the invention, the detachable module is a hub, such as a USB hub. The detachable module may also consist of an external media bay which may include a CD-RW drive, a CD drive, a DVD drive, a ZIP drive, and a 3.5 floppy drive.

The foregoing has outlined rather broadly the features and technical advantages of the present invention in order that the detailed description of the invention that follows may be better understood. Additional features and advantages of the invention will be described hereinafter which form the subject of the claims of the invention. It should be appreciated by those skilled in the art that the conception and specific embodiment disclosed may be readily utilized as a basis for modifying or designing other structures for carrying out the same purposes of the present invention. It should also be realized by those skilled in the art that such equivalent constructions do not depart from the spirit and scope of the invention as set forth in the appended claims.

#### **Brief Description of the Drawings:**

For a more complete understanding of the present invention and the advantages thereof, reference is now made to the following descriptions taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a perspective view of an exemplary embodiment of a plurality of peripheral devices coupled to a portable computer stand being retracted for receiving a portion of a portable computer in accordance with one aspect of the invention.

FIG. 2 is a perspective view of a portable computer stand with a portable computer recessed in the base of the stand and coupled to a plurality of peripheral device in accordance with one aspect of the invention.

FIG. 3 is a perspective view of a plurality of peripheral devices coupled to an electrical connector and a wireless communicator of a portable computer stand in accordance with one aspect of the invention.

FIG. 4 is a perspective view of a plurality of peripheral devices coupled to a detachable  
5 module and a wireless communicator of a portable computer stand in accordance with one aspect of the invention.

FIG. 5 is a perspective view of a plurality of peripheral device coupled to a detachable module of a portable computer stand in accordance with one aspect of the invention.

FIG. 6 is a perspective view of an exemplary embodiment of a portable computer stand  
10 being retracted for receiving a portion of a portable computer in accordance with one aspect of the invention.

FIG. 7A is a front-end perspective view of the exemplary embodiment for the portable computer stand of FIG. 6 with the support in a fully extended position to accommodate a portable computer in a substantially vertical orientation according to one aspect of the  
15 invention.

FIG. 7B is a backend perspective view of the exemplary embodiment for the portable computer stand of FIG. 6 with the support in a fully extended position to accommodate a portable computer in a substantially vertical orientation according to one aspect of the invention.

FIG. 8 is a perspective view of a portable computer stand coupled to a plurality of detachable modules according to one aspect of the invention.

FIG. 9 is a backend perspective view of the exemplary embodiment of a power adapter coupled to a portable computer stand according to one aspect of the invention.

FIG. 10A is a view of an exemplary embodiment of a portable laptop computer stand  
25 being activated responsive to a first user action in accordance with one aspect of the present invention.

FIG. 10B is a view of the portable laptop computer stand of FIG. 11A illustrating a stand door being opened away from a base anchor movably coupled to a stand base.

FIG. 10C is a view of the portable laptop computer stand of FIG. 11B illustrating a stand support being pivotally oriented in a vertical orientation.

FIG. 10D is a view of the portable laptop computer stand of FIG. 11C illustrating the stand door being closed with the stand support positioned in the vertical orientation.

5        FIG. 11A is a view of the portable laptop computer stand of FIG. 11D being activated responsive to a second user action in accordance with one aspect of the present invention.

FIG. 11B is a view of the portable laptop computer stand of FIG. 12A illustrating stand housing being provided with the base anchor moving away from the stand base.

10       FIG. 11C is a view of the portable laptop computer stand of FIG. 12B illustrating a portable laptop computer being disposed in the stand housing in a vertical orientation.

FIG. 11D is a view of the portable laptop computer stand of FIG. 12C illustrating the base anchor movement towards the stand base for securely engaging a first portion of the portable laptop computer in the stand housing while a second portion of the portable laptop computer being held by the stand support to provide an ergonomic viewing position thereto.

15       FIG. 12A is a perspective view of a motor housed in a detachable module according to one aspect of the invention.

FIG. 12B is a perspective view of a detachable module coupled to a bottom side of a portable computer stand, the bottom side including an opening for the motor.

20       FIG. 12C is a perspective view of a detachable module including a motor coupled to a portable computer stand.

FIG. 12D is a perspective view of the motor extending the support of the base and moving the anchor away from the base.

FIG. 13 is a view of portable device recessed at an angle in the base of a portable computer stand in accordance to one aspect of the invention..

25       FIG. 14 is an exemplary embodiment of the support of a portable computer stand holding a portable computer recessed in the stand in accordance to one aspect of the invention.

FIG. 15A is an exemplary embodiment of a portable computer stand including a wireless communicator housed in the anchor in accordance to one aspect of the invention.



FIG. 15B is an exemplary embodiment of the circuitry of the wireless communicator housed inside the anchor.

FIG. 16 is an exemplary embodiment of a receiver housed in the anchor portion or a portable computer stand according to one aspect of the invention.

5 FIG. 17 is an exemplary embodiment of a transmitter housed in the anchor portion or a portable computer stand according to one aspect of the invention.

FIG. 18 is an exemplary embodiment of a port replicator circuitry in accordance to one aspect of the invention.

10 FIG. 19 is an exemplary embodiment of a plurality of system comprising a plurality of peripheral devices and a portable computer stand.

### **Detailed Description**

The invention relates generally to a stand and more particularly to a portable stand for providing a communication path between at least one peripheral device and a portable  
15 computer and providing ergonomic support to the portable device including, but is not limited to a portable computer such as a laptop or notebook computer generally comprising a display screen and a desktop base. Specifically, the invention contemplates positioning a portable computer in an ergonomic viewing position such as a fully opened state having the display screen of the portable computer oriented in a plane substantially parallel to a plane of the  
20 desktop base of the portable computer. Thus, according to one aspect of the invention, the portable computer may be ergonomically oriented in a substantially upright and/or substantially vertical position to facilitate relatively improved viewability by a single user and/or a group of individuals. The invention should, however, not necessarily be restricted to the field of these applications, geometric features or materials as will be readily evident. In  
25 addition, the invention contemplates providing communication, such as a port replicator, hub, a plurality of external media bays, and/or wireless communication path between a portable device recessed in the stand and at least one peripheral device. Specifically, the invention contemplates providing at least one electrical connector, at least one detachable module, and/or a transmitter and receiver pair for communicating between peripheral devices and a

portable device recessed in the stand. The use of the same reference numerals in different drawings indicates similar or identical terms.

FIG. 1 is a perspective view of an exemplary embodiment of a portable computer stand 50 with a wireless communication path to a plurality of wireless peripheral devices 150. Such devices may include, but are not limited to a wireless printer a wireless digital camera, a wireless scanner, a wireless mouse, a wireless full-size keyboard, a wireless foldable keyboard, wireless speakers, and/or wireless digital pen pad. The portable computer stand may also include at least one electrical cable. The at least one electrical cable 152 may be routed up the support 75 and may be coupled to a portable device recessed in the portable computer stand 50. In one exemplary embodiment, an electrical cable 152, such as a parallel port cable, a serial port cable, and/or a USB port cable may be routed up the support 75. In yet another exemplary embodiment, the electrical cable may be a power cord 154 provided to a portable computer recessed in the stand.

As persons skilled in the art will appreciate that typical portable computers generally include a desktop computer base and a foldable display screen. As illustrated in FIG. 2, the portable computer 200 may recessed in the portable computer stand 50, and may include a desktop portion 204 and a display portion 202. In addition, a plurality of wireless devices 150 may be coupled to the portable computer 200.

Referring to FIG. 3, in accordance to one aspect of the invention, the portable computer stand 50 may include an electrical connector and a wireless communicator for providing a communication path between a plurality of wired peripheral devices 160 and a plurality of wireless peripheral devices 150 to and from a portable computer 200 when recessed in the portable computer stand 50. FIG. 3 is a perspective view of a plurality of wired peripheral devices 160 coupled to an electrical connector 300 and a plurality of wireless peripheral devices 150 coupled to a wireless communicator 302 of a portable computer stand 50 in accordance with one aspect of the invention. The electrical connector 300 may be integrated to the bottom side of the portable computer stand 50. The wireless communicator 302 is preferably housed within the stand 50, more specifically in the front end of the portable computer stand. As such, a plurality of wired peripheral device may be coupled to the

electrical connector 300, which may include a port replicator. The port replicator may emulate the ports on a portable computer and may also include a plurality of ports not available on the portable computer. Such ports may include, but are not limit to a parallel port, a serial port, a USB port, and/or a PS/2 port. A plurality of wired peripheral devices 160 (e.g., a printer, a scanner, etc.) may couple to the port replicator via a parallel port cable, a serial port cable, a USB port cable, etc. In order to couple the wired peripheral devices 160 to a portable computer, an electrical cable may be provided. In one exemplary embodiment, the electrical cable 152 may be a USB port cable adapted to couple with a USB port of the portable computer. In yet another exemplary embodiment, the electrical cable 152 may be a parallel port cable adapted to couple with a parallel port of the portable computer. Furthermore, in another exemplary embodiment, the electrical cable 152 may be a serial port cable adapted to couple with a serial port of the portable computer.

In yet another aspect of the invention, the electrical connector 300 may include a hub, for example, a USB hub. The USB hub may include a plurality of USB ports and may also include at least one parallel port, at least one serial port, and/or at least one PS/2 port. In order to couple the peripheral devices to a portable computer, an electrical cable may be provided. In one exemplary embodiment, the electrical cable 152 may be a USB port cable adapted to couple with a USB port of the portable computer.

In one exemplary embodiment, the electrical connector may include an external media bay. The external media bay may include, but is not limited to, a compact disk-read only memory drive ("CD ROM drive"); a digital video disc drive ("DVD drive"); a compact disc-read and write drive ("CD-RW drive); a 3.5 floppy disc drive; and/or a ZIP drive

Furthermore, in accordance to one exemplary embodiment of the invention, a wireless communicator 302 may be housed in the front end 70 of the portable computer stand 50. The wireless communicator 302 may provide a wireless communication path between at least one wireless peripheral device 150 such as, but are not limited to, a wireless mouse, a wireless keyboard, and/or a wireless speaker set. According to one aspect of the invention, the wireless communicator 302 may be a radio frequency transmitter and receiver. The radio frequency receiver may be adapted to receive a plurality of signals simultaneously. In one

embodiment, the radio frequency receiver may be adapted to receive at least two signals simultaneously. According to another aspect of the invention, the wireless communicator may be an infrared transmitter and receiver. The infrared receiver may be adapted to receive multiple signals simultaneously.

5 Furthermore, the wireless communicator 302 and the electrical connector 300 may operate simultaneously. In one embodiment, the electrical cable 152 may connect to a hub (not shown), e.g., a USB hub, within the stand 50. The electrical cable 152 may be USB port cable and may allow for simultaneous communications between peripheral devices and a portable computer.

10 In one exemplary embodiment of the invention, a power cable 154 may be provided to supply a power source to a portable computer recessed in the stand 50. The power cable 154 may be attached to a transformer and may couple to an outlet (not shown)

FIG. 4 is a perspective view of a plurality of peripheral devices 160 coupled to a electrical connector 400 and a wireless communicator 302 housed in the portable computer stand 50 in accordance with one aspect of the invention. The electrical connector 400 may be a detachable module 403 coupled to the bottom side of the portable computer stand 50. In one exemplary embodiment of the invention, the detachable module 403 may be a port replicator. The port replicator may provide at least the same ports on a portable computer and may also provide a plurality of other ports such as, but not limited to a parallel port, a serial port, a USB port, and/or a PS/2 port. The port replicator may provide a communication path to at least one peripheral device coupled to the detachable module and a portable computer recessed in the portable computer stand 50. An electrical cable 152, such as a parallel port cable, a serial port cable, or a USB port cable, may couple to the desktop portion of a portable computer to provide the communication path.

25 In yet another exemplary embodiment of the invention, the detachable module may be a USB hub. The USB hub may provide a plurality of USB ports and may also provide at least one parallel port and at least one serial port. The USB hub may provide a communication path to at least one peripheral device coupled to the detachable module and a portable computer recessed in the portable computer stand. An electrical cable 152, such as a USB

port cable, may provide the communication path between at least one peripheral device coupled to the hub and a portable computer recessed in the portable computer stand 50 (not shown).

In one exemplary embodiment, the electrical connector may include an external media bay. The external media bay may include, but is not limited to, a compact disk-read only memory drive ("CD ROM drive"); a digital video disc drive ("DVD drive"); a compact disc-read and write drive ("CD-RW drive"); a 3.5 floppy disc drive; and/or a ZIP drive.

Furthermore, in accordance to one exemplary embodiment of the invention, a wireless communicator 302 may be housed in the front end 70 of the portable computer stand 50. The wireless communicator 302 may provide a wireless communication path between at least one wireless peripheral device 150 such as, but not limited to, a wireless mouse, a wireless keyboard, and/or a wireless speaker set. According to one aspect of the invention, the wireless communicator may be a radio frequency transmitter and receiver. The radio frequency receiver may be adapted to receive a plurality of signals simultaneously. In one embodiment, the radio frequency receiver may be adapted to receive at least two signals simultaneously. According to another aspect of the invention, the wireless communicator may be an infrared transmitter and receiver. The infrared receiver may be adapted to receive multiple signals simultaneously.

FIG. 5 is a perspective view of a plurality of wired peripheral devices 160 coupled to a electrical connector 400 of a portable computer stand in accordance with one aspect of the invention. In one exemplary embodiment, the electrical connector may be a detachable module 403, in which the detachable module may include a port replicator. In another exemplary embodiment, the detachable module 403 may include a hub, such as a USB hub. In one exemplary embodiment, the electrical connector may include an external media bay. The external media bay may include, but is not limited to, a compact disk-read only memory drive ("CD ROM drive"); a digital video disc drive ("DVD drive"); a compact disc-read and write drive ("CD-RW drive"); a 3.5 floppy disc drive; and/or a ZIP drive. The functionality of the detachable module 403 will further be discussed below.

FIG. 6 is a perspective view of an exemplary embodiment of a portable computer stand 50 being retracted for receiving a portion of a portable device such as a portable computer (not shown) in accordance with one aspect of the invention. The portable computer stand 50 may comprise a base 60 having a housing 65 formed for receiving the portion of the portable computer, an anchor 70 movably coupled to the base 60, and a support 75 operably coupled to the base 60.

In one exemplary embodiment, the base 60 may comprise a back bezel 80 having a door 85 operatively coupled thereto. For example, the door 85 may be selectively and/or automatically opened and closed to store the support 75. The support 75 may include an easel 90, an easel extension 100 to extend the easel 90 upwardly from the base 60, and an easel latch 105 to fixedly hold the easel extension 100 at a desired position. The easel 90 may be operably coupled to the back bezel 80 for providing vertical support thereon to the portable computer. The support 75 may also include at least one electrical cable routed from the anchor 70 up the support 74. In one exemplary embodiment, a port cable, such as a parallel port cable, a serial port cable, or a USB cable is routed up the support 75 and may couple to the desktop portion of the portable computer. In yet another exemplary embodiment, a power cord 154 may also be routed up the support 75 and may couple to the desktop portion of the portable computer.

The anchor 70 may include a front bezel 120 operably coupled to the back bezel 80. The front bezel 120 may be formed for providing the housing 65 to receive the portable computer therein. For example, the desktop portion of the portable computer may be removably clamped in the housing 65 against the back bezel 80. In particular, the desktop portion having generally a distal end may be securely disposed within the housing 65.

The base 60 may include a retractable stand bottom 130 movably coupled to the back bezel 80 and fixedly coupled to the front bezel 120. The retractable stand bottom 130 in conjunction with the front bezel 120 may be formed for permitting a selective lateral movement of the back bezel 80. Such selective lateral movement may be either in a first direction to release the back bezel 80 from the front bezel 120. Thus, in turn providing the housing 65. Alternatively, the selective lateral movement may be in a second direction for

engaging the front bezel 120 with the back bezel 80 in a manner to securely hold the portable computer therebetween.

In operation, to releasably engage the desktop portion within the housing 65 of the base 60, in a secure relationship therewith, a locking mechanism may be provided through the anchor 70. Similarly, a latching mechanism may be included for the support 75 to releasably hold the desktop portion in a secure relationship therewith. Furthermore, for automatically operating the anchor 70, in a horizontal plane, to receive one end of the desktop portion of the portable computer within the housing 65, an activation mechanism could be readily devised. For example, the activation mechanism may include a motor (See FIG. 12A-12D). The activation mechanism may further comprise an ejector mechanism for causing the support 75 to automatically move in a predetermined position. The predetermined position of the support 75 facilitates clamping of the portable computer thereto. For disengaging the anchor 70 from the base 60 to decouple the distal end of the desktop portion of the portable computer, a release mechanism may be provided which may include a lever (not shown).

In one exemplary embodiment, for the present exposition, representative details for a variety of the above referenced mechanisms are generally described herein with reference to following drawings. Persons skilled in the art will recognize that these, and other, aspects of the invention will be better appreciated and understood when considered in conjunction with the following description and the accompanying drawings. It should be understood, however, that the following description, while indicating exemplary embodiments of the invention and numerous specific details thereof, is given by way of illustration and not of limitation. Many changes and modifications may be made within the scope of the invention without departing from the spirit thereof, and the invention includes all such modifications.

FIG. 7A is, as viewed in the drawing figure, a front-end perspective view of the exemplary embodiment for the portable computer stand 50 of FIG. 1 with easel extension 100 of the support 75 in a fully extended position to accommodate a portable computer (not shown) in a vertical orientation according to one aspect of the invention. FIG. 2B is, as viewed in the drawing figure, a rear perspective view of the exemplary embodiment for the portable computer stand 50 of FIG. 2A. Referring now to FIGS 2A and 2B, the easel

extension 100 generally extends the easel 90 for securely positioning the portable computer at such a height that allows relatively easy viewing for either an individual user or a group of two or more individuals while the portable computer may be supported in a vertical orientation within the housing 65.

5           FIG. 8 is an exemplary embodiment of a portable computer stand 50 and a plurality of detachable modules. According to one aspect of the invention, the portable computer stand 50 may be coupled to a detachable module 800, 801. In one embodiment of the invention, the detachable module may include a port replicator providing a communication path to at least one peripheral device and a portable computer recessed in the stand. In yet another  
10           embodiment, the detachable module 801 may be a hub, for example, a USB hub. The portable computer stand 50 may also be coupled to a second detachable module. In one exemplary embodiment, the detachable module 801 may be coupled to the detachable module 802. The detachable module 802 may include another port replicator or hub (not shown). In one embodiment, the detachable module 802 may include an external media bay. The external  
15           media bay may include, but is not limited to, a compact disk-read only memory drive ("CD ROM drive"); a digital video disc drive ("DVD drive"); a compact disc- read and write drive ("CD-RW drive); a 3.5 floppy disc drive; and/or a ZIP drive. The detachable modules 801, 802 may further coupled to a portable device via an electrical cable 152. In one embodiment, the electrical cable 152 may be a parallel port cable adapted to couple to a parallel port of the  
20           portable device. In another embodiment, the electrical cable may be a serial port cable adapted to couple to a serial port of the portable device. In yet another exemplary embodiment, the electrical cable may be a USB port cable, where the USB cable may provide an interface to the plurality of peripherals attached to the at least one module, and may provide bi-directional data to and from the portable computer.

25           FIG. 9A is a bottom perspective view of the exemplary embodiment including a power adapter coupled to a portable computer stand according to one aspect of the invention. The power adapter 900 may provide power to the port replicator, hub, and/or external media bays included in the electrical connector. In another embodiment, the power adapter 900 may provide power to a detachable module attached to the bottom side of the portable computer



stand 50. Furthermore, providing power to either an electrical connector or a detachable module may also include batteries 910. Batteries 910 may be adapted to provide a short term power supply to the electrical connector as compared to the power adapter 900.

FIGS. 10A through 10D disclose to an activation process of an exemplary embodiment of a portable computer stand 50 in accordance with one aspect of the present invention. With reference to FIGS. 10A through 10D, in particular, FIG. 10A is a view of the portable computer stand 50 being activated responsive to a first user action 605. For example, the first user action 605 may entail pressing a button (not shown) to initiate a motorized operation of unfolding of the portable computer stand 50. In the alternative, activation may be a spring driver, or activation may be manual. In FIG. 10B, the motor opens a stand door 85, where the stand door 74 is being generally opened away from a stand base 60 and a base anchor 70. FIG. 10C is a view of the portable computer stand 75 illustrating a stand support 75 being pivotally oriented in a vertical orientation generally indicated by an arrow 645. As shown in FIG. 10D, the stand door 85 is being closed as indicated by arrow 660 and the stand support 75 positioned in the vertical orientation to receive a portable laptop computer generally having a desktop portion generally including a keyboard, and a display screen. Accordingly, the portable laptop computer can be readily oriented in a desired ergonomic viewing position.

FIGS. 11A through 11D relate to a motorized clamping process of the portable computer stand 50 in accordance with one aspect of the present invention. Referring to FIGS. 11A through 11D, specifically, FIG. 11A is a view of the portable laptop computer stand 75 being activated responsive according to the first user response 605. As the motor moves the base anchor 70 away from the stand base 60, in FIG. 11B, a stand housing 65 is being provided. Next, disposing a portion of a representative computer 710 within the stand housing 65 in a substantially upright orientation is illustrated in FIG. 11C. As shown by a representative arrow 725 in FIG. 11D, after a second user response 606, the motor moves the base anchor 70 towards the stand base 70 for securely engaging the portion of the representative computer 200 within the stand housing 65 while the rest of the representative computer is being held by the stand support 75 to provide the desired ergonomic viewing position.

In one exemplary embodiment, the motor may be incorporated in the portable computer stand 50. After the initial user response, whether by pressing a button or flipping a switch, the motor within the stand would first extend the support and secondly, move the base anchor 630 away from the stand base 640 to provide a recess in which a portable device may be orientated. After the portable device is recessed in the portable computer stand 50, the motor may be initiated by either pressing a button or flipping a switch. The motor may then engage the portable device, and more specifically, the desktop portion of the portable device by moving the anchor 630 towards the base stand 640.

In one exemplary embodiment, the motor may be incorporated within a detachable module coupled to the portable computer stand 50. As illustrated in FIG 12A – 12D, and more specifically, FIG. 12A, a motor 1300 may be incorporated within a detachable module 1200. The detachable module 1200 may be coupled to the bottom side 1350 of the portable computer stand 50, in FIG. 12B. The bottom side 1350 may include an opening 1352 such that the motor 1300 may be able to control the movement of the stand, base, and anchor of the portable computer stand 50. The detachable module 1200 may be coupled to the portable computer stand 50, as illustrated in FIG. 12C. FIG. 12D illustrates portable computer stand in a position to accept a portable computer, where the motor may extend the easel and form a housing 715 by moving the anchor 70 away from the base 60.

As mentioned above, a portable computer device may include a desktop portion and a display portion. Referring to FIG. 13, the desktop portion 1410 may be recessed in a portable computer stand. In one embodiment, the portable computer device may be substantially vertically. In yet another embodiment, the portable computer device may be recessed within the portable computer stand at an angle. A portable device 1400 may include a desktop portion 1410 and a display portion 1420. The desktop portion may be supported by portable computer stand 50 at an angle  $\alpha$ . Angle  $\alpha$  may range between  $60^\circ$  and  $90^\circ$ . As such, the portable computer device 1400 may be substantially upright, approximately  $90^\circ$  and may also be recessed at an ergonomically advantage angle for better viewing of the display portion 1420.

In addition, the display portion 1420 may be moveable to further enhance the visibility of the display portion 1420 as well as to reduce glare. In one embodiment, a plane of the display portion 1420 may be moveable between a plane of the display portion 1420 and a plane of the desktop portion 1410 at an angle  $\beta$ . Angle  $\beta$  may range between 160° and 195°, and is preferably 180°.

The easel extension 100 of support 75 of a portable computer stand 50 may be adapted to extend upwardly and hold a portable computer within the stand 50. In some exemplary embodiments, the support 75 may be adapted to clasp onto the display portion of the portable device. In yet another exemplary embodiment, the support may be adapted to clasp onto the desktop portion of the portable device. Referring to FIG. 14, the easel extension 100 of support 75, coupled to the base is extended upward to hold the portable device 1400. For the sake of brevity, the display portion 1420 is folded down to clearly illustrate the easel extension 100 of the support 75 clasping onto the desktop portion 1410.

As noted above, the portable computer stand may house a wireless communicator, i.e., a radio frequency transmitter and receiver or a infrared transmitter and receiver. Referring to FIG. 15A, the portable computer stand 50 may include a wireless communicator 70 housed in the anchor 70. The wireless communicator 302 may include a transmitter 1700 and a receiver 1600. As such, referring to FIG. 15B, the anchor may house circuitry 1620 adapted to provide a wireless communication path between at least one wireless peripheral device and a portable device recessed in the portable computer stand.

In one embodiment, the radio frequency ("RF") receivers may be able to integrate a plurality of receive a plurality of radio frequency signals simultaneously. The transmitter and receiver may operate in the range of frequencies between 27MHz and 916 MHz, although one skilled in the art will appreciated that many other RF carrier frequencies would be suitable for use with wireless peripherals according to invention. Referring to FIG. 16, a RF signal receiver 1600 synchronously receives RF signals via receiving antenna 1602. Each of the signals have a different carrier frequency. The RF signals are then provided to a frequency reducer 1610, which may include an RF amplifier 1620 and a frequency-converting circuit 1630. The frequency-converting circuit 1630 may be adapted to decrease the different carrier

frequency of the received RF signals. The RF amplifier 1620 may be provided for amplifying the RF signals to increase the signal to noise ratio of the RF signals.

In one embodiment, the RF amplifier 1620 may include a high-pass filter 1622 and an amplifying unit 1624. The high-pass filter 1622 may be used for filtering the received RF signals and may block a low frequency noise included in the received RF signals. The filtered signals may then be provided to the amplifying unit 1624, where the amplifying unit may increase the amplitude of the filtered signals.

In yet another embodiment, the frequency-converter circuit 1630 may be provided for converting the amplified signals into a plurality of intermediate frequency signals. The frequency-converter circuit may include a local oscillator 1632 and a mixer 1634. The local oscillator 1632 may provide an signal with a constant frequency. The oscillated signal and the amplified signals may be provided to the mixer 1634, where the signals are mixed to output a plurality of intermediate frequency signals. The intermediate signals may be provided to a demodulator 1640 which may provide output signals from a plurality of wireless peripheral devices. The demodulator 1640 may include a plurality of bandpass filters 1642, where each bandpass filter may pass a corresponding intermediate frequency signal and block other intermediate frequency signals. The demodulator 1640 may also include a plurality of amplifiers 1644 which amplifies and transmits the corresponding intermediate signal. Furthermore, the demodulator may also include a plurality of demodulators 1646 which may receive a corresponding amplified signal from a corresponding amplifier 1644 and may demodulate the received signal to obtain an output signal. The output signals may subsequently be provided to a converting unit 1650 which may convert the signals and provided the converted signals to the portable device 1400.

In one exemplary embodiment, the RF transmitter is contemplated. Referring to FIG. 17, a RF transmitter 1700 may include a CPU 1702 which may control the transmitting radio frequency by controlling the phase lock loop chip ("PLL") 1710. The CPU 1720 may initially receive default information about the transmitting radio frequency channel from an EEPROM 1720 at power up and may transfer the information to the PLL 1720. The CPU 1702 may then provide a switch and displacement information to a VCXO 1730 and a crystal 1740 which

together act as a frequency shift keying ("FSK") modulator. The frequency may be altered by changing the frequency of the crystal 1740. The VCXO 1730 may then interact with the PLL 1710 and the loop filter 1712 and may create a frequency multiplier which generates the carrier frequency of the transmitting RF signal. The loop filter 1712 may stabilize the  
5 frequency. The information to be transmitted may then be provided to voltage controlled oscillator ("VCO") 1714 which in turn may provide the modulated carrier signal to a loop antenna 1760 through an RF amplifier 1750.

In yet another embodiment, a infrared transmitter and receiver may be adapted to provide a communication path between a plurality of wireless peripheral and a portable device  
10 recessed in a portable computer stand. According to one aspect of the invention, the infrared receiver may be adapted to receive a plurality of simultaneously from a plurality of wireless peripherals. As such, the infrared receiver may be adapted to receive multiple signals on multiple carrier wavelengths, which may subsequently converted and provided to a portable device. The infrared transmitter and receiver may include a carrier wavelengths which may  
15 typically be in the range of 850nm to 950 nm. Such a range may be within the IRDA range of 850-900nm.

As noted above, the portable computer stand may comprise a port replicator. A port replicator, as previously describe, may allow a plurality of peripheral devices to be simultaneously connected. Referring to FIG. 18, circuitry 1900 may comprise a plurality of  
20 input and output pins, in which circuitry 1900 provides a design for port replication. The circuitry 1900 may include a internal processor adapted to execute instructions also an input clock signal. In one embodiment, a plurality of pins from circuitry 1900 may be provided to an upstream data converter 1910, which may convert incoming data from the peripheral devices coupled to the port replicator, to a single format signal, such as a USB data stream.  
25 The data converted may be sent to the electrical cable 152. The incoming data stream may comprise a plurality of different type of signals, such as parallel data signals, serial data signals, etc. As such, the upstream data converter 1910 may comprise a serial to parallel data converter or a parallel to serial data converter.

The data sent from a portable device may also need to be formatted. In one embodiment, the data coming from the portable device may be sent in serial format. A peripheral device coupled to a parallel port and thus, may need a parallel data stream. Downstream data converter 1920 may thus, include a parallel to serial converter may comprise  
5 a serial to parallel data converter or a parallel to serial data converter.

In one exemplary embodiment, circuitry 1900 may be coupled to a standard bus system, such as a industry standard architecture ("ISA") bus. The bus system may route data between the converters 1910 and 1920, the peripheral devices, and a portable computer. The circuitry 1900 may further coupled to a memory device 1940. The memory device may be a  
10 FLASH type memory or a random access memory ("RAM"). The memory device may provide temporary storage of data streams between the at least one peripheral device and the portable computer. Furthermore, a plurality of pins may from circuitry 1900 and provide a power and ground to the circuitry from power source 1960 and ground source 1950, respectively.

The present invention provides for an ergonomically portable computer stand as well as providing for a communication path between a portable device and a plurality of peripheral devices. Such peripheral devices may include, but is not limited to a keyboard, a mouse, a speaker, an earphone, a printer, a scanner, a digital camera, a pointing device, a microphone, a PC camera, a gamepad, a joystick, a game wheel, and a digital pen pad. The peripheral  
20 devices may also be wireless peripherals adapted to communicate via a wireless connection (e.g., infrared transmitter/receiver pair or radio frequency transmitter/receiver pair). The present invention also allows for a small, portable stand, and a small, portable electrical path that allows for easy transportation. For example, referring to FIG. 19, the portable computer stand 50 and a plurality of peripheral devices 1800 including, but not limited to, a foldable  
25 keyboard, a mouse, and a speaker set may be packaged into a case 1810. The case 1810 may provide individual slots for the portable computer stand 50 and the plurality of peripheral devices 1800.

Generally speaking, it is a feature of the present invention to position a laptop computer having a display screen opened at an angle between the ranges of 160-195° and

desktop portion recessed in a portable computer stand at an angle between 60-90°. Another feature of the present invention is to provide an activator to quickly set up the stand. The activator may first extend the support for holding the portable device. Secondly, the motor moves the anchor away from the base of the stand to form a housing in which a portable  
5 device may recess. Finally, after situating the portable device in the stand, the activator moves the anchor towards the base to engage the portable device. It is also feature to provide a wireless communicator to couple a plurality of a wireless peripheral device to a portable device recessed in the stand . Another feature is that the invention provides an electrical connector (e.g., a port replicator, a hub, or a external media bay) that may allow the user to  
10 expand the number of ports needed to couple peripheral devices to a portable device recessed in the stand. Yet another feature of the present invention is provide detachable modules that include a port replicator, a hub, or an external media bay that may allow to conform to the needs of a user as well as provide the convenience of a desktop computer in mobile form . It is also a feature of the present invention to provide an aesthetic presentation of the laptop  
15 computer in a substantially vertical orientation. The substantially vertical orientation may also allow for improved visibility of the display portion as well as allowing to adjust the display portion when glare is a problem.

Although the present invention and its advantages have been described in detail, it should be understood that various changes, substitutions and alterations can be made to the  
20 embodiments herein without departing from the spirit and scope of the invention as defined by the appended claims. Moreover, the scope of the present application is not intended to be limited to the particular embodiments of the process, machine, manufacture, composition of matter, means, methods and steps described in the specification. As one of ordinary skill in the art will readily appreciate from the disclosure of the present invention, processes,  
25 machines, manufacture, compositions of matter, means, methods, or steps, presently existing or later to be developed that perform substantially the same function or achieve substantially the same result as the corresponding embodiments described herein may be utilized according to the present invention. Accordingly, the appended claims are intended to include within

their scope such processes, machines, manufacture, compositions of matter, means, methods, or steps.

We claim as follows: